

WHAT IS CLAIMED IS:

1. An apparatus for configuring a spanning tree used for a network in which a plurality of virtual LANs coexist comprising:

5 at least one bridge having a plurality of ports, the bridge capable of configuring a plurality of virtual LANs by logically combining the plurality of ports; and

10 holding means for holding on the bridge by each of the plurality of virtual LANs, information that is a combination between a code for identifying each of the plurality of virtual LANs configured by the bridge and a code for identifying a root bridge in a spanning tree for each of the plurality of virtual LANs.

15 2. An apparatus according to claim 1, wherein the holding means is provided by the number of virtual LANs in the device as a VLAN-ID for each of the plurality of virtual LANs that is information to be held in the bridge and as a spanning tree protocol instance that is
20 a database containing an MAC address of a root bridge in the plurality of virtual LANs.

3. An apparatus according to claim 1, further comprising:

25 means for discriminating whether or not Configuration Bridge Protocol Data Units (hereinafter, referred to as BPDUs) that the bridge receives bundle BPDUs corresponding to a plurality of VLANs in one

packet, and releasing the bundled BPDUs for each VLAN;

means for processing a spanning tree by instance of each VLAN based on the BPDU, thereby updating the instance; and

5 means for discriminating whether or not a BPDU outputted after updating the instance is a BPDU relevant to a trunk port, and when the BPDU is the BPDU relevant to trunk port, bundling a plurality of BPDUs in one packet, and outputting them.

10 4. A method for configuring a spanning tree used for a network in which a plurality of virtual LANs coexist, the method comprising the steps of:

providing at least one bridge having a plurality of ports, the bridge being capable of configuring
15 a plurality of virtual LANs by logically combining the plurality of ports; and

holding on the bridge for each of the plurality of virtual LANs, information that is a combination between a code for identifying each of the plurality of
20 virtual LANs configured by the bridge and a code for identifying a root bridge in a spanning tree for each of the plurality of virtual LANs.

5. An apparatus for configuring a spanning tree used for a network in which a plurality of virtual LANs
25 coexist, the apparatus comprising:

at least two bridges each having a plurality of ports, the bridges each being capable of configuring

a plurality of virtual LANs by logically combining the plurality of ports;

5 holding means for holding on the bridge for each of the plurality of virtual LANs, information that is a combination between a code for identifying each of the plurality of virtual LANs configured by the bridge and a code for identifying a root bridge in a spanning tree for each of the plurality of virtual LANs;

10 output means for, when there is outputted plural items of spanning tree configuration information containing a code in which one of the bridges identifies a root bridge for each of the plurality of virtual LANs, bundling in one packet at least two items of spanning tree configuration information contained
15 in the plurality of spanning tree configuration information and outputting them; and

control means for acquiring the spanning tree configuration information on each of the plurality of virtual LANs from the packet in a bridge which receives
20 the packet, thereby controlling opening and closing of each of the plurality of ports that the bridge has for each of the plurality of virtual LANs.

25 6. An apparatus according to claim 5, wherein the holding means is provided by the number of virtual LANs in the apparatus as a spanning tree protocol instance that is a database containing a VLAN-ID of each of the plurality of virtual LANs that is information to be

held on the bridge and an MAC address of a root bridge in the plurality of virtual LANs.

7. An apparatus according to claim 6, further comprising:

5 means for discriminating whether or not BPDUs that the bridge receives are bundled BPDUs that correspond to a plurality of VLANs in one packet, and releasing the bundled BPDUs for each VLAN;

10 means for processing spanning tree by instance for each VLAN based on the BPDU, and updating the instance; and

15 means for discriminating whether or not a BPDU to be outputted after updating the instance is a BPDU relevant to a trunk port, and, when the BPDU is the BPDU relevant to the trunk port, bundling a plurality of BPDUs in one packet, and outputting them.

8. A method for configuring a spanning tree used for a network in which a plurality of virtual LANs coexist, the method comprising the steps of:

20 providing at least two bridges each having a plurality of ports, the bridges each being capable of configuring a plurality of virtual LANs by logically combining the plurality of ports;

25 holding on the bridge for each of the plurality of virtual LANs, information that is a combination between a code for identifying each of the plurality of virtual LANs configured by the bridge and a code for

identifying a root bridge in a spanning tree for each of the plurality of virtual LANs;

when there is outputted plural items of spanning tree configuration information containing a code in which one of the bridges identifies a root bridge for each of the plurality of virtual LANs, bundling in one packet at least two items of spanning tree configuration information contained in the plurality of spanning tree configuration information and outputting them; and

acquiring the spanning tree configuration information on each of the plurality of virtual LANs from the packet in a bridge which receives the packet, thereby controlling opening and closing of each of the plurality of ports that the bridge has for each of the plurality of virtual LANs.

9. A spanning tree protocol system, comprising:
a network in which a plurality of VLANs coexist and a spanning tree protocol is applied; and

a spanning tree protocol instance having a database containing a VLAN-ID of at least the VLAN in the plurality of VLANs and an MAC address of a root bridge in the VLAN for each of the plurality of VLANs.

10. A bridge system used for a network in which there exists a plurality of VLANs to which a spanning protocol is applied, the bridge system comprising:

at least one bridge having a plurality of ports, the bridge being capable of configuring a plurality of

virtual LANs by logically combining the plurality of ports; and

5 a spanning tree protocol instance having a database containing a VLAN-ID of at least the VLAN of the plurality of VLANs and an MAC address of a root bridge in the VLAN for each of the plurality of VLANs.

11. A bridge system used for a network in which there exists a plurality of VLANs to which a spanning tree protocol is applied, the bridge system comprising:

10 at least two bridges each having a plurality of ports, the bridges each being capable of configuring a plurality of virtual LANs by logically combining the plurality of ports;

15 a spanning tree protocol instance having a VLAN-ID of at least the VLAN of the plurality of VLANs and an MAC address of a root bridge in the VLAN for each of the plurality of VLANs;

20 output means for, when one of the bridges outputs plural items of spanning tree configuration information containing a code for identifying a root bridge for each of the plurality of virtual LANs, bundling in one packet at least two items of spanning configuration information contained in the plural items of spanning tree configuration information and outputting them; and

25 control means for acquiring the spanning tree configuration information on each of the plurality of virtual LANs from the packet in a bridge which receives

the packet, thereby controlling opening and closing of each of the plurality of ports that the bridge has for each of the plurality of virtual LANs.

11/10/2001 10:00 AM